RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII **Marks: 40**

marks

Chapter: MATRICES Set-2 **Time: 90**

minutes

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

1. Given a matrix $A=\begin{bmatrix}2 & 3 & 9\\3 & 9 & 6\\1 & 6 & 7\end{bmatrix}$, which of the elements a_{ij} follows the condition i=j.

a) 9, 9, 1 b) 2, 9, 7 c) 2, 3, 9 d) 2, 3, 1

2. Consider the matrix $A=\begin{bmatrix}4 & 6 & 9\\12 & 11 & 10\end{bmatrix}$. What is the type of matrix?

a) Row matrix b) Column matrix c) Horizontal matrix d) Vertical matrix

3. Find the value of a,b,c,d if $\begin{bmatrix}a+b & c\\a-b & 2c+d\end{bmatrix}=\begin{bmatrix}3 & 2\\1 & 6\end{bmatrix}$

a) 3, 2, 1, 4 b) 3, 2, 1, 6 c) 2, 2, 2, 2 d) 2, 1, 2, 2

4. Find the value of x and y if $2\begin{bmatrix}5 & x\\y-4 & 6\end{bmatrix}+\begin{bmatrix}-4 & 1\\3 & 2\end{bmatrix}=\begin{bmatrix}6 & 3\\10 & 14\end{bmatrix}$

a) x=-1, y=9 b) x=-1, y=-9 c) x=1, y=-9 d) x=1, y=9

5. Which of the following condition is incorrect for matrix multiplication?

a) A(BC)=(AB)C b) A(B+C)=AB+AC c) AB=0 if eitherAorBis0 d) AB=BA

6. Which of the following is not the property of transpose of a matrix?

a) (A')'=A b) (A+B)'=A'+B' c) (AB)'=(BA)' d) (kA)'=KA'

7. Which of the following is the reversal law of transposes?

a) (A-B)'=B'-A' b) (AB)'=B'A' c) (AB)'=(BA)' d) (A+B)'=B'+A'

8. If $A=\begin{bmatrix}a & b\\c & d\end{bmatrix}$, then which of the following is skew-symmetric?

a) AA' b) A+A' c) 2(A+A') d) A-A'

9. Which of the following is not a valid elementary operation?

a) $R_i \leftrightarrow R_j$ b) $R_i \rightarrow R_j+kR_i$ c) $R_i \rightarrow kR_i$ d) $R_i \rightarrow 1+kR_i$

10. Which of the following column operation is incorrect for the matrix $A=\begin{bmatrix}1 & 2 & 5\\6 & 3 & 8\end{bmatrix}$?

a) $C_1 \rightarrow 3C_1$ b) $C_2 \rightarrow C_1+C_2$ c) $C_2 \rightarrow 2+2C_2$ d) $C_2 \rightarrow 2C_1+2C_2-C_3$

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

11 If a matrix has 5 elements, then write all possible orders it can have.

12 If $A=\begin{bmatrix}2 & 4\\5 & 6\end{bmatrix}$, then Prove that A + A' is a symmetric matrix.

13 If $A=\begin{bmatrix}1 & 1 & 1\\1 & 1 & 1\\1 & 1 & 1\end{bmatrix}$ then prove that $A^n=\begin{bmatrix}3^{n-1} & 3^{n-1} & 3^{n-1}\\3^{n-1} & 3^{n-1} & 3^{n-1}\\3^{n-1} & 3^{n-1} & 3^{n-1}\end{bmatrix}$

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14 If A is a square matrix such that $A^2 = I$, then find the simplified value of $(A - I)^3 + (A + I)^3 - 7A$.

15 Write the element a of a 3 × 3 matrix A = $[a_{ij}]$, whose elements are given by $a_{ij} = |i-j|/2$

16 If matrix A = $\begin{bmatrix}1 & -1\\-1 & 1\end{bmatrix}$ and $A^2 = kA$. then write the value of k.

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17 If A = $\begin{bmatrix}2 & 0 & 1\\2 & 1 & 3\\1 & -1 & 0\end{bmatrix}$, then find $A^2 - 5A + 4I$ and hence find a matrix X such that $A^2 - 5A + 4I + X = 0$.

18 If A = $\begin{bmatrix}1 & 0 & 2\\0 & 2 & 1\\2 & 0 & 3\end{bmatrix}$ and $A^3 - 6A^2 + 7A + kI_3 = 0$, find the value of k.

19 Consider 2 families A and B. Suppose there are 4 men, 4 women and 4 children in family A and 2 men, 2 women and 2 children in family B. The recommended daily amount of calories is 2400 for a man, 1900 for a woman, 1800 for children and 45 grams of proteins for a man, 55 grams for a woman and 33 grams for children.

1. The requirement of calories of family A is
   a. 15800 b. 15000 c. 24000 d. 24400
2. The requirement of proteins for family B is
   a. 266 grams b. 300 grams c. 332 grams d. 560 grams
3. If A and B are two matrices such that AB = B and BA = A, then $A^2 + B^2$ equals
   a. A + B b. 2BA c. 2AB d. AB